



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,149	07/03/2003	Takeshi Masuda	026390-00009	3313

4372 7590 08/28/2006

ARENT FOX PLLC
1050 CONNECTICUT AVENUE, N.W.
SUITE 400
WASHINGTON, DC 20036

EXAMINER
ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
1763	

DATE MAILED: 08/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/612,149

Applicant(s)

MASUDA ET AL.

Examiner

Rudy Zervigon

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 June 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claims 1-4, and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Okase; Wataru (US 5,884,009 A). Okase teaches a film-forming apparatus (Figure 7; column 15, lines 6-67) in which a gas mixture (from 75a,b; Figure 7) prepared in a gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) is introduced into a film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) through a shower head (7c; Figure 7; column 15, lines 6-67) to form on a substrate (W; Figure 7), the apparatus comprising the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) for admixing a raw gas (75a,b; Figure 7; column 15, lines 6-67) and a reactive gas (75a,b; Figure 7; column 15, lines 6-67), the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) connected to the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67), the shower head (7c; Figure 7; column 15, lines 6-67) disposed on the top face of the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67), a stage (61; Figure 7; column 15, lines 6-7) arranged in the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) for placing the substrate (W; Figure 7) to be processed and capable of freely going up and down (60, 64; Figure 7; column 14; lines 30-45) and a supply port disposed at the peripheral portion (perimeter 73b; Figure 7 - 72 permits radial flow - column 15, lines 17-25) on the bottom face of the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) supplying the gas mixture (from 75a,b; Figure 7) prepared in the gas mixing chamber (volume between 7a,b;

Art Unit: 1763

Figure 7; column 15, lines 6-67) directly to the top face of the shower head (7c; Figure 7; column 15, lines 6-67) such that the gas (75a,b; Figure 7; column 15, lines 6-67) mixture prepared in the gas-mixing chamber (volume between 7a,b; Figure 7; column 15, lines 6-67) and fed to the shower head (7c; Figure 7; column 15, lines 6-67) through the peripheral portion (perimeter 73b; Figure 7 - 72 permits radial flow - column 15, lines 17-25) on the top face of the shower head (7c; Figure 7; column 15, lines 6-67) flows towards the central portion of the shower head (7c; Figure 7; column 15, lines 6-67), as claimed by claim 1

Okase further teaches:

- i. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein an exhaust port (45; Figure 7) for discharging the exhaust gas (75a,b; Figure 7; column 15, lines 6-67) from the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) is disposed on the side wall (71; Figure 7) of the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) and below the level of the stage (61; Figure 7; column 15, lines 6-7) at an up position whereby the exhaust gas (75a,b; Figure 7; column 15, lines 6-67) generated in the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) is directed and guided towards the side wall (71; Figure 7) of the chamber and discharged through the exhaust port (45; Figure 7) arranged on the side wall (71; Figure 7), as claimed by claim 2
- ii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1 or 2, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is large, the shower conductance is small and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (between 61 and 7c; Figure 7;

Art Unit: 1763

column 15, lines 6-67) from the central portion of the shower head (7c; Figure 7; column 15, lines 6-67) (hereunder referred to as "central gas (75a,b; Figure 7; column 15, lines 6-67) injection") upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c; Figure 7; column 15, lines 6-67) having a large diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased or that a shower head (7c; Figure 7; column 15, lines 6-67) having a large diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is increased, to thus prevent the central gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of a gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 3. The entirety of Applicant's claim 3 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

Art Unit: 1763

- iii. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1 or 2, wherein when the flow rate of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is small, the shower conductance is large and the gas (75a,b; Figure 7; column 15, lines 6-67) mixture is injected into the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) from a shower head (7c; Figure 7; column 15, lines 6-67) and into a region above a substrate (W; Figure 7) to be processed from the periphery of the shower head (7c; Figure 7; column 15, lines 6-67) (hereunder referred to as "peripheral gas (75a,b; Figure 7; column 15, lines 6-67) injection") upon the formation of a film, the apparatus (Figure 7; column 15, lines 6-67) is so designed that it comprises a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter, that the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced or that a shower head (7c; Figure 7; column 15, lines 6-67) having a small diameter is used and the distance between the shower head (7c; Figure 7; column 15, lines 6-67) and the substrate (W; Figure 7) to be processed is reduced, to thus prevent the peripheral gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture and to make the manner of the gas (75a,b; Figure 7; column 15, lines 6-67) injection of the gas (75a,b; Figure 7; column 15, lines 6-67) mixture uniform, as claimed by claim 4. The entirety of Applicant's claim 4 is an intended use of the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in

a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- iv. The film-forming apparatus (Figure 7; column 15, lines 6-67) as set forth in claim 1, wherein a gas ring (76; Figure 7; column 14; lines 30-45) is disposed at the periphery of the top face of the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) so that an inert gas (77; Figure 7; column 15, lines 6-67), which is not directly involved in the film formation, can uniformly be introduced into the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) through the gas ring (76; Figure 7; column 14; lines 30-45) and along the inner surface of the side wall of the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67), as claimed by claim 11

Claim Rejections - 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
4. Claims 5-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A). Okase is discussed above. Okase does not teach the relative dimensions of Okase's showerhead (7c; Figure 7; column 15, lines 6-67) diameter vs. Okase's film forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) diameter as claimed

Art Unit: 1763

by claims 5. Okase does not teach the relative distance between Okase's substrate (W) and Okase's showerhead (7c; Figure 7; column 15, lines 6-67) as claimed by claims 7. Okase further does not teach the operating parameters of pressure and gas flow in the range of the claimed inequalities – claim 6, and 8-10.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize Okase's relative apparatus dimensions and Okase's operating parameters.

Motivation to optimize Okase's relative apparatus dimensions and Okase's operating parameters is for generating uniform thickness of deposited films as taught by Okase (column 13, lines 20-30). Further, it would be obvious to those of ordinary skill in the art to optimize the operation of the claimed invention (*In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980); *In re Hoeschele*, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969); *Merck & Co. Inc. v. Biocraft Laboratories Inc.*, 874 F.2d 804, 10 USPQ2d 1843 (Fed. Cir.), cert. denied, 493 U.S. 975 (1989); *In re Kulling*, 897 F.2d 1147, 14 USPQ2d 1056 (Fed. Cir. 1990), MPEP 2144.05). Further it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (*Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

5. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okase; Wataru (US 5,884,009 A) in view of Reimer; Paul et al. (US 6,817,377 B1). Okase is discussed above. Okase does not teach a film-forming apparatus (Figure 7; column 15, lines 6-67), which comprises a load-lock chamber for stocking wafers conveyed from a wafer cassette in the

Art Unit: 1763

atmospheric conditions; a film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67); a conveyer chamber positioned between the load-lock chamber and the film-forming chamber (between 61 and 7c; Figure 7; column 15, lines 6-67) - claim 13.

Reimer teaches semiconductor processing apparatus (Figure 1) including a load-lock chamber (25c) for stocking wafers conveyed from a wafer cassette in the atmospheric conditions; a film-forming chamber (25a); a conveyer chamber (25b) positioned between the load-lock chamber (25c) and the film-forming chamber (25a).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus.

Motivation to add Reimer's load-lock chamber (25c) and conveyer chamber (25b) to Okase's apparatus is for process automation as taught by Reimer (column 1; lines 10-13).

Response to Arguments

6. Applicant's arguments with respect to claims 1-11, and 13 have been considered but are moot in view of the new grounds of rejection.

Conclusion

7. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

Art Unit: 1763

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (571) 273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.



8/21/6